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Original Article

Epidemiology of childhood diseases in an urban resettlement colony in Delhi

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ABSTRACT

Objective: To assess the prevalence and determinants of childhood diseases which are covered under IMNCI in an urban resettlement colony in Delhi.

Materials and methods: A community-based cross-sectional study was carried out in Gokulpuri area in Delhi from January to December 2014 among 550 mothers/caretakers who were residing in the study area and selected by stratified random sampling. Data were collected using a pre-tested semi-structured questionnaire consisting of items on socio-demographic details and history of acute respiratory infections (ARI), diarrhoea, measles and malaria in the past 15 days. Data were analyzed by using SPSS 17. Chi-square test/Fisher's exact test was used for testing any significance of association and “p” value <0.05 was considered statistically significant.

Results: The study showed that 282 (51.2%) children were 1–5 years old and 290 (52.7%) were male. Prevalence of ARI was found to be 16% followed by diarrhoea to be 4.2% in the last 15 days. There was no case of measles in the area. 123 (22.3%) were found to be moderately malnourished. Prevalence of ARI was significantly less in exclusively breastfed children compared to not exclusively breastfed children ($p = 0.002$). For other childhood diseases, the difference was not statistically significant.

Conclusion: The childhood diseases had a considerable burden in the area. Protective factors like colostrum and exclusive breastfeeding should be promoted by raising awareness among caregivers. Intensive health education campaigns should be carried out in the area to prevent childhood diseases.

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1. Introduction

Child mortality rate is often described as the best barometer of social and economic progress of any population.¹ It is defined as the number of deaths of children aged less than 5 years per 1000 live births. In India, it is estimated as 53 per 1000 live births in 2013.² With about 2 million annual deaths of under-fives, India also accounts for 21% of the global child mortality.³ According to United Nations Children's Fund (UNICEF), most child deaths result from one of the following five causes – acute respiratory infections (ARI), diarrhoea, measles, malaria and malnutrition.⁴ Diarrhoea and pneumonia being the leading causes in the post-neonatal period, attention must be given to the management of these two illnesses. Malnutrition is associated with about 50% of all deaths among children.⁵ Infants under two months old who are not breastfed are six times more likely to die from diarrhoea or ARI than those who are breastfed.⁶

India too is not untouched by the burden of these diseases among children. Estimates says that diarrhoea is the third most common cause of death in under-five children, responsible for 13% deaths in this age-group, killing an estimated 300,000 children in India each year.⁷ Million deaths study based on the registrar general of India mortality statistics had reported 369,000 deaths due to pneumonia among children 1–59 months at the rate of 13.5/1000 live births.⁸ Looking at the public health importance of these diseases, it is important that urgent interventions should be taken for their prevention and control. Child mortality can be reduced adequately if timely interventions are planned. Success of any intervention depends on the baseline analysis of epidemiology of disease and related factors at community level because diseases like malaria, pneumonia and diarrhoea can be effectively treated with cheap and widely available first line drugs at the primary care level in early stage of the diseases.⁹ Integrated management of neonatal and childhood illnesses (IMNCI) was launched in India to reduce childhood mortality and morbidity due to diarrhoea, ARI, measles, malaria and malnutrition which have community level interventions where community and front line health workers were trained in detection and first line management of these diseases.¹⁰ This paper presents results of a study conducted with an objective to assess the prevalence and determinants of childhood diseases (ARI, diarrhoea, measles and malaria) and malnutrition which are covered under IMNCI in an urban resettlement colony in Delhi.

2. Materials and methods

2.1. Study setting and participants

This was a cross-sectional community-based study carried out, from January 2014 to December 2014, in Urban Health Centre Gokulpuri, the field practice area under the Department of Community Medicine, Maulana Azad Medical College, Delhi. The study area was a resettlement colony having total population of 26,350 with 3431 under-five children. Mothers/caretakers who were residing in the study area for more than 6

months and gave their voluntary consent to participate were included in the study.

2.2. Sample size and sampling

The period prevalence of childhood disease, diarrhoea, among the children aged less than five years was used to calculate the required sample size of study subjects i.e. mothers/caretakers. A population-adjusted sample size of 527 was calculated using period prevalence of diarrhoea as 25.2%¹¹ after taking type I error of 5%. Finally, 550 mothers/caretakers consented to participate. The study area, that is the re-settlement colony, is divided into four blocks and slum. Study participants were selected proportionate to the population in each block by stratified random sampling.

2.3. Study tool

(1) A pre-tested, semi-structured questionnaire containing items on (a) Identification data of children and their caretakers i.e. age, gender, religion, educational status, area of residence and socio-economic status. (b) Child's health profile: birth weight, birth order, birth history, immunization status, feeding history, complementary feeding. (c) History of four illnesses (ARI, diarrhoea, measles and malaria) in the past 15 days was used. The questionnaire was prepared in English and translated in local language. The tool was pilot tested in a similar setting among 30 subjects for reliability and validity and suitable modifications were done afterwards and questionnaire was finalized. (2) Portable weighing scale with capacity up to 150 kg and which measures weight to the nearest 200 g.

2.4. Definitions of variables

Pneumonia,¹² Diarrhoea,¹³ Measles,¹² Malaria¹² and Malnutrition¹⁴ were defined after through literature review and reference to standard guidelines.

2.5. Study methodology

All the households with under-five children were enlisted by house-to-house survey from all four blocks and the slum of Gokulpuri. Stratified random sampling was used to select the number of study subjects. According to the population in each block and slum, the number of caretakers was selected proportionately from each strata. 110 subjects were taken from block A, 108 from block B, 121 from block C, 117 from block D and 94 from slum area. Each household having under-five children was visited. If there was more than one under-five child in a household, the youngest one was included in the study. If the house was found locked, it was visited three times to contact the caretaker and in case of unavailability of caretaker the next house having an under-five child was selected without disturbing the overall sampling procedure.

Children fulfilling the inclusion criteria were selected from each family. The investigator described the project to the caretakers, and obtained written consent from those willing to participate. Each of the 550 caretakers included were given an identification number with a referral slip, a copy of which was

kept by the investigator. After recording the preliminary data, the caretakers were subjected to the interview.

The child was assessed for malnutrition by measuring weight for age and length/height for age criteria.¹⁵ Management of any child having an episode of illness was done at the health centre.

3. Statistical analysis

The data were entered in MS-Excel and analyzed by using SPSS software version 17. Qualitative data were expressed in percentages and quantitative data were expressed in mean $\pm$ standard deviation (SD). Chi-square test/Fisher's exact test was used for testing any significance of association for qualitative variables. "*p*" value <0.05 was considered statistically significant.

4. Ethical issues

The study was approved by the ethical committee of Maulana Azad Medical College. The objectives and procedure of the study was explained to all mothers/caretakers. Written informed consent was taken from all mothers/caretakers willing to participate in the study. The investigator gave basic medical care and proper referral wherever needed. The option to opt out of the study was kept open without any clause. Complete confidentiality regarding patient information was maintained through all stages of the study.

5. Results

Most of the caretakers were mothers ($n = 534$, 97.1%), followed by grandmothers ($n = 16$, 2.9%). Among these caretakers, majority of them i.e. 443 (80.6%) were in the younger age group (20–30 years), followed by 48 (8.7%) mothers in the 31–40 years age group. Majority of the caretakers ($n = 493$, 89.6%) were Hindu by religion, followed by Muslims (8.9%).

121 (22%) families had more than 6 family members while majority of the families i.e. 252 (45.8%) had 4–6 family members. Among the mothers, majority ($n = 330$, 60%) were educated up to primary or middle school level and 79 (14.4%) were illiterate. Only 41 (7.5%) mothers were employed whereas vast majority ($n = 509$, 92.5%) were unemployed. Majority of the caretakers ($n = 450$, 81.8%) belonged to lower class and 99 (18%) caretakers were in upper socio-economic class according to modified BG Prasad's (2013) socio-economic classification (Table 1).

It was observed that 282 (51.2%) children were 1–5 years old and 239 (43.5%) were 2 months–1 year old. Out of 550 children 290 (52.7%) were male. All the children were singleton deliveries. Most of the children ($n = 475$, 86.4%) were delivered by normal vaginal delivery and 507 (92.2%) were institutional deliveries. However, home delivery accounted for 43 (7.8%) of the total deliveries. Majority of children ($n = 483$, 87.8%) were born at term and 352 (64%) children were of second or third birth order in the family (Table 2).

Prevalence of ARI was found to be 16% [2 weeks–2 months: 0.7%, 2 months–1 year: 7.8% and 1 year–5 years: 7.5% ($n = 88$)]

Table 1 – Socio-demographic characteristics of mothers/caretakers.

Characteristics	Number (N = 550)	Percentage (%)
Age (years)		
<20	28	5.1
20–30	443	80.6
31–40	48	8.7
>40	31	5.6
Religion		
Hindu	493	89.6
Muslim	49	8.9
Others	8	1.5
Number of family members		
<4	177	32.2
4–6	252	45.8
>6	121	22
Education		
Illiterate	79	14.4
Primary school	168	30.5
Middle school	162	29.5
High school	91	16.5
Higher secondary school	36	6.5
Graduate	14	2.6
Socio economic status (BG Prasad classification)		
<773 V	450	81.8
773–1546 IV	99	18
1547–2577 III	1	0.2
2578–5155 II	0	0
>5156 I	0	0

followed by diarrhoea [2 weeks–2 months: nil, 2 months–1 year: 2% and 1 year–5 years: 2.2% ($n = 23$, 4.2%)] in the last 15 days. There was no case of measles in the area.

Nutritional status of the children was assessed using World Health Organization (WHO) weight for age criterion and about three-fourths of the children ($n = 415$, 75.5%) were found to be well nourished. Among the remaining children, 123 (22.3%) were found to be moderately malnourished (Fig. 1).

When the prevalence of diseases like ARI, diarrhoea and fever were compared across children who were given colostrum and those who were not, it was found that prevalence of ARI differed significantly in the two groups ($p = 0.049$) implying that prevalence of ARI is lesser in children who are given colostrum. Prevalence of ARI was significantly less in exclusively breastfed children compared to not exclusively breastfed children ($p = 0.002$) (Table 3). For other childhood diseases, the difference was not statistically significant. There

Table 2 – Socio-demographic profile of under-five children.

Characteristics	Number (N = 550)	Percentage (%)
Age		
2 weeks–2 months	29	5.3
2 months–1 year	239	43.5
1 year–5 years	282	51.2
Sex		
Male	290	52.7
Female	260	47.3
Birth order		
1	167	30.4
2–3	352	64
>3	31	5.6

Table 3 – Prevalence of childhood diseases in children with associated factors.

Determinants	ARI	Diarrhoea	Fever not tested for malaria
Colostrum given; N = 509, n(%)	77 (15.1) [*]	20 (3.9)	28 (5.5)
Exclusive breastfeeding; N = 395, n(%)	52 (13.2) [*]	14 (3.5)	21 (5.3)
Full immunization; N = 257, n(%)	36 (14)	10 (3.9)	21 (8.2)
Well nourished; N = 415, n(%)	58 (14)	16 (3.9)	18 (4.3)
Socio economic status; N = 450, n(%)	73 (16.2)	19 (4.2)	25 (5.6)
Lower socio economic status (PCI < 773)			
Chi-square test used to compare the groups.			
[*] p < 0.05.

Fig. 1 – Prevalence of malnutrition in under-five children.

was no significant association between prevalence of diseases and immunization status, nutritional status of the children, education status of mothers/caretakers, family size as well as socio-economic status of the family.

6. Discussion

The present study was conducted among caregivers of under-five children residing in a resettlement colony in Delhi. Prevalence of IMNCI diseases and their epidemiology was studied. In the present study, most (97.1%) of the caretakers were mothers, and the rest were grandmothers (2.9%). Majority (80.5%) of them were 20–30 years of age. Mean age of the caretakers was 26.9 years (± 18.8) and mean age of the mothers was 25.46 years (± 4.1). In a study conducted by Soon et al. in Philippines,¹⁶ mean age of respondents and mothers was slightly higher, about 33 and 30.7 years. The difference could be due to earlier age at marriage in India.

About 14.4% mothers were illiterate and all others (85.6%) had received primary schooling. Similar findings were seen in a study in Philippines showing 10% illiterate mothers and 90% of mothers who at least did their primary schooling.¹⁶ However, in a study conducted in Aligarh in India, 80% of mothers/caretakers were illiterate.¹⁷ This can be attributed to the fact that the literacy rate in Delhi (86%) is higher than the literacy rate of India overall (74%).¹⁸

Most (86.4%) of the children were delivered normally and 92.2% were institutional deliveries with only 7.8% being delivered at home. In comparison, there were 68.6% institutional deliveries in Delhi as per district level household and facility survey-3 (DLHS-3)¹⁵ while the corresponding figure for India is 73% as per coverage evaluation survey (CES) 2009.¹⁹

In this study, the prevalence of ARI in the last 15 days was 16% which was similar to a study conducted in this area in 2007,²⁰ and it was lesser than 22% prevalence reported from Gujarat (2012).²¹ However, the study in Gujarat was conducted in both rural and urban areas during the peak season for ARI which could explain the higher prevalence reported in the study.

Overall prevalence of diarrhoea in the present study was found to be 4.2% which was similar to the study conducted in this area in 2007 where it was 7.7%.²⁰ A very high prevalence of 36% was observed in a study conducted in Aligarh¹⁷ in urban slums and 25.2% in a study conducted in Kashmir by Ahmed et al. in 2008.¹¹ The reason for low prevalence in our study could be the availability of accessible health services and frequent health education activities like health talk and awareness generation about childhood diseases and sanitation practices carried out by staff and medical students in the field practice area.

The present study showed that the prevalence of malnourished children was 22.3%. The findings were consistent with those reported by another study carried out in 2015 among urban slums in Puducherry, South India.²² However, as per National Family Health Survey-3 (NFHS-3), there were 27% malnourished children in Delhi and the prevalence in this study was lower than state level figures.²³ Routine nutritional counselling to the mothers at the health centre could explain this lower prevalence in present study. Current study confirmed the fact that breastfeeding and colostrum is significantly associated with lower risk of ARI among children. Same was reported by other authors as well in other studies conducted elsewhere.^{24,25}

7. Strength of the study

The article focuses on a critical area of child health in developing countries. Burden and associated factors for childhood diseases are significant for framing future policies and decision taking at community level in Indian setting. It gives a true representative picture of common childhood diseases because of its community-based study design. Apart from this, well-calculated sample size, appropriate statistical analysis and sound methodology are some other strengths.

8. Limitations

The current study describes prevalence of IMNCI diseases in past 15 days only which could have led to lower reported

prevalence of diseases. Self-reported data were relied upon rather than documented evidence which could have led to information bias. However, the study succeeded in highlighting the important points of concern.

9. Conclusion and recommendations

The childhood diseases had a considerable burden in the area. Protective factors like colostrum and exclusive breastfeeding should be promoted by raising awareness among caregivers. Intensive health education campaigns should be carried out in the area to prevent childhood diseases.

Conflicts of interest

The authors have none to declare.

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